Sughrue
SUGHRUE MION, PLLC

RECEIVED
CENTRAL FAX CENTER
DEC 0 6 2005

2100 Pennsylvania Avenue, NW
Washington, DC 20037-3213
T 202.293.7060
F 202.293.7860
www.sughrue.com

FAX

Date	December 6, 2005		
To	Examiner Jennifer A. Boyd		
Of	PTO Group Art Unit 1771		
Fax	571 273-8300 and 571 273-1473		
From	Peter D. Olexy, P.C./ddw		
Subject	SUBMISSION OF 1.132 DECLARATION		
Our Ref	Q54509	Appln No	09/317,986
Conf No	9754	Inventors	Hidenori YAMANAKA, et al.
Pages	11 (including cover sheet)		

Please call attention to problems with this transmission by return fax or telephone. Thank you.

This fax filing includes:
1. This cover sheet
2. 1.132 Declaration

CERTIFICATION OF FACSIMILE TRANSMISSION

Sir:

I hereby certify that the above identified correspondence is being facsimile transmitted to Examiner Jennifer A. Boyd at the Patent and Trademark Office on December 6, 2005 at 571-273-8300

Respectfully submitted,

Deangela D. Williams

RECEIVED
CENTRAL FAX CENTER

DEC 0 6 2005

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Hidenori YAMANAKA, et al.

Appln. No.: 09/317,986

Confirmation No.: 9754

Filed: May 25, 1999

Docket No: Q54509

Group Art Unit: 1771

Examiner: Jennifer A. Boyd

For: MELT-BLOWN, NON-WOVEN FABRIC OF POLYARYLENE SULFIDE AND METHOD FOR PRODUCING SAME

SUBMISSION OF EXECUTED DECLARATION UNDER 37 C.F.R. §1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith is a copy of an executed Declaration Under 37 C.F.R. §1.132 signed by Satoshi Inoue.

Respectfully submitted,

Peter D. Olexy
Registration No. 24,513

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860
WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: December 6, 2005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Yamanaka, et al.

Serial No.: No. 09/317,986

Filed: May 25, 1999

For: MELT-BLOWN, NON-WOVEN FABRIC OF POLYARYLENE SULFIDE AND METHOD FOR PRODUCING SAME

Art Unit: 1771

Examiner: JENNIFER A. BOYD

DECLARATION UNDER 37 CFR § 1.132

Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

Sir:

I, Satoshi Inoue, a citizen of Japan, declare that:

(1) I am one expert to perform the experimentation related to the above-identified application.

(2) I reside at 1-2-2, H-505 Central Park East, Utase, Mihama-ku, Chiba-shi, Chiba, 261-0013, Japan.

(3) I graduated from Seikei University, Master's Programs in Industrial Chemistry, Graduate School of Engineering in 1989.

(4) I joined Tonen Chemical Corporation, and was assigned to General Research Center, Petrochemical Research Center, Heat Resistant Polymer Group in Tonen Corporation as a researcher, in 1989.

(5) I was transferred to Technical Development Department, PPS Research and Development in 1992.

(6) I was transferred to Tohpren Co. Ltd., Technical Development Department, as a researcher (Assistant Manager) in 1999.

(7) I was transferred to Dainippon Ink and Chemicals, Incorporated as a researcher due to business assignment of PPS business from Tonen Chemical

Corporation to Dainippon Ink and Chemicals, Inc., and was assigned to Plastics Technical Department, PPS Technical Group, as a researcher in 2002.

(8) I am now Assistant Manager of the Plastics Technical Department since 2002.

(9) I understand the present invention and the prosecution history of the above-identified application.

(10) I have reviewed the Office Action mailed May 31, 2005 and the references cited by the Examiner.

(11) To establish the criticality of the non-Newtonian Coefficient in the range of $1.05 \leq n \leq 1.20$ for polyarylene sulfide having a branched structure as claimed in the present application, I have conducted the following experiments.

<u>Experiments</u>

1. Starting Materials

Various Kinds of PPS polymers:

"T-1G," "K-4G," "LD-10G," "LT-30G" and "ML-305" produced by our company DIC (DAINIPPON INK AND CHEMICALS, INC.);

"M2100" supplied from Toray Industries, Inc.; and

"RYTON" P-4 ("P-4") supplied from Phillips Petroleum Co.

2. Preparation of test samples

All samples were pulverized.

3. Measurements

<u>Capillograph Measurement</u>

Cappillograph measurements were entrusted to MITSUI CHEMICAL ANALYSIS & CONSULTING SERVICE INC., Laboratory for Physical Properties of Materials at Iwakuni-shi, Polymer Physical Properties Division, and the measurements were carried using "Capillograph-1B" manufactured by Toyo Seiki Kogyo Co., Ltd. under the condition of: at a temperature of 300°C and L/D = 40.

Each 10g sample in a state of powder or granule was inserted into a

barrel, and the measurement was carried out from low shearing speed to the predetermined shearing speed.

Thus, the relation between the shearing speed SR (1/sec) and the shearing stress SS (Pa) was obtained and summarized in Tables and Figures below.

By Capillograph Measurement of "P-4," there was obtained a melt viscosity of 2310 poise at 300°C.

Melt Viscosity Measurement (Viscosity V6)

Melt Viscosity was measured using "Flow tester CET-500C" manufactured by Shimadzu Corporation under the condition of at a temperature of 300 °C and a load of 20kgf after holding the samples for 6 minutes at 300 °C.

DSC Measurement

DSC was measured using "PYRIS Diamond DSC" manufactured by Perkin Elmer Instrument Co. under a flow of nitrogen gas (N_2 gas) at a rate of 20ml/min.

Each 4mg powdered sample was heated firstly from a temperature of 40°C to 350°C at a rate of 10°C/min, maintained at a temperature of 350°C, thereafter cooled from 350°C to 120°C at a rate of 10°C/min, and heated secondary from a temperature of 120°C to 350°C. Each melting point was determined from a peak of endothermic temperature at the secondary heating in the respective DSC charts, which shows the melting point of crystals formed in each sample polymer at the step of cooling after the first heating.

By DSC measurement of "P-4," there was obtained a melting point of 276.5°C.

Method for obtaining the non-Newtonian Coefficient

The non-Newtonian Coefficient (N) of each sample was obtained by measuring the shearing speed SR (1/sec) and the shearing stress SS (Pa) using the Capillograph-1B under the condition of: at a temperature of 300°C and L/D

= 40, followed by calculating from the following formula:

$SR = K \cdot SS^N$,

wherein SS represents shearing stress, SR represents shearing speed, K represents a constant, and N represents the non-Newtonian Coefficient.

The above formula can be converted to the following formula:

$\log (SR) = N \cdot \log (SS) + \log K$,

thereby obtaining a linear relationship between log (SR) and N · log (SS) on a logarithmic graph paper.

Thus, the non-Newtonian Coefficient (N) can be obtained from the slope of the liner line obtained by plotting log (SS) as the x-axis and log (SR) as the y-axis.

The relation between the non-Newtonian Coefficient (N) and Viscosity V6 (Pa, s) or Viscosity V6 (poise) are summarized in Table 1 and Figures 1 and 2 with the results of Capillograph Measurements shown in Tables and Figures below.

Table 1

Results of Capillograph Measurement
for U.S. Patent Application No. 09/317,986
(MITSUI CHEMICAL ANALYSIS CENTER)

Supplier	DIC	DIC	DIC	DIC	DIC	Toray	Phillips
Grade	T-1G	ML305	K-4G	LD-10G	LT-30G	M2100	P-4
L/N	1D1X088G	#0180	1D4R001G	1C10LD1G	1B90001G	1906002	80-7-0397
V6 (Pa·s)	35	54	223	1390	3120	153	231
V6(poise)	350	540	2230	13900	31200	1630	2310
N	1.05	1.10	1.56	1.80	2.04	1.49	1.87
Comment	Non-cure	Liner	Highly cure	Mild cure	TCB branch	Cure	Highly cure

N : Non-Newtonian Coefficient

Conditions for Measurement
Apparatus : Capillograph-1B (Toyo Seiki Kogyo Co., Ltd.)
Temterature: 300°C
L/D : 40/1

Fig. 1

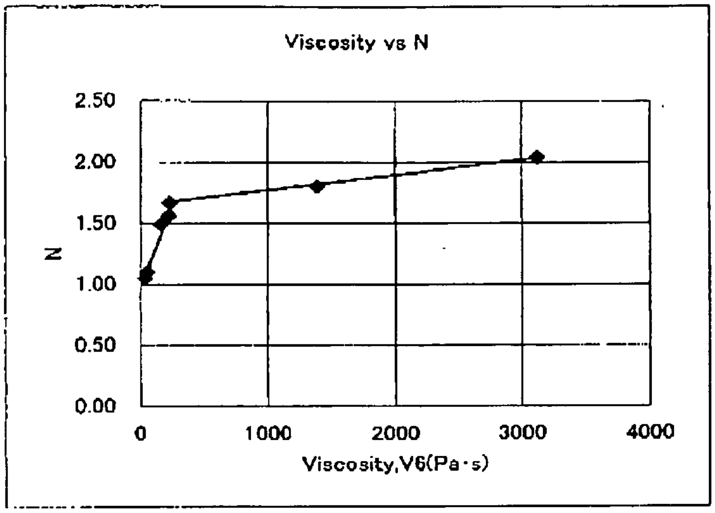
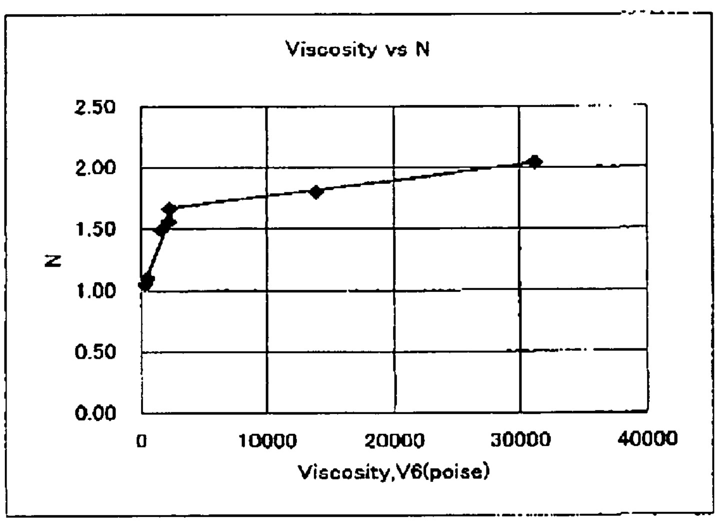
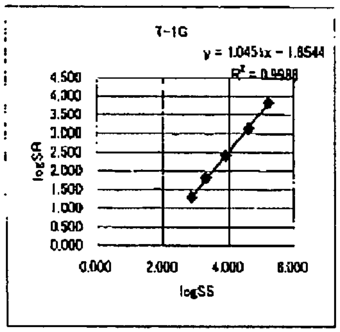

Viscosity vs N
2.50
2.00
1.50
1.00
0.50
0.00
N
0
1000
2000
3000
4000
Viscosity,V6(Pa·s)

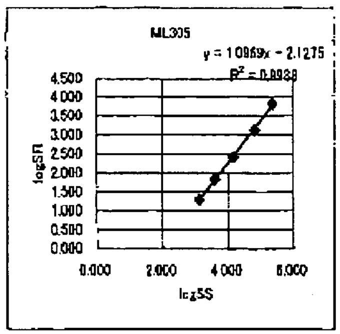
Fig. 2

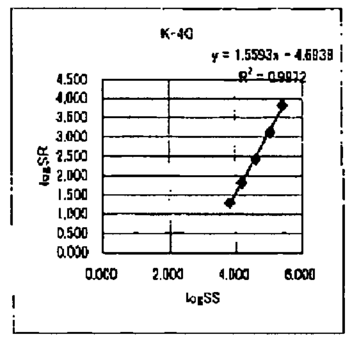

Viscosity vs N
2.50
2.00
1.50
1.00
0.50
0.00
N
0
10000
20000
30000
40000
Viscosity,V6(poise)

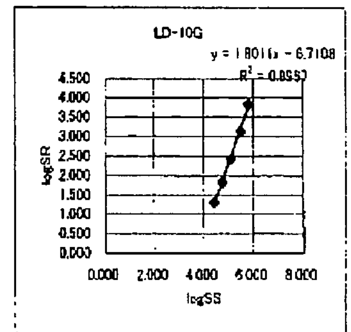
Tables and Figures

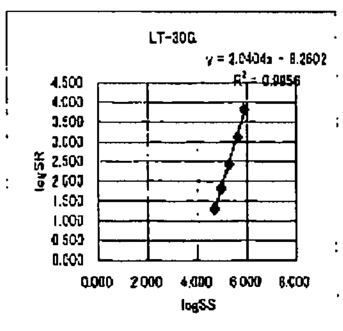
Supplier	DIC		DIC		DIC		DIC		DIC		Toray		Phillips	
Grade	T-1G		ML305		K-4G		LD-10G		LT-30G		M2100		P-4	
V6 (Pa·s)	35		54		223		1390		3120		163		231	
V6 (poise)	350		540		2230		13900		31200		1630		2310	
SR S^-1	SS Pa	Vis Pa·s	SS Pa	Vis Pa·s	SS Pa	Vis Pa·s	SS Pa	Vis Pa·s	SS Pa	Vis Pa·s	SS Pa	Vis Pa·s	SS Pa	Vis Pa·s
2.000E+01	7.066E+02	3.533E+01	1.308E+03	6.539E+01	6.492E+03	3.246E+02	2.643E+04	1.322E+03	4.580E+04	2.290E-03	5.333E+03	2.666E+02	9.440E+03	4.720E+02
6.667E+01	1.950E+03	2.924E+01	3.861E+03	5.792E+01	1.549E+04	2.324E+02	5.583E+04	8.344E+02	8.952E+04	1.343E+03	1.453E+04	2.180E+02	2.284E+04	3.426E+02
2.667E+02	7.984E+03	2.994E+01	1.488E+04	5.582E+01	4.009E+04	1.503E+02	1.259E+05	4.720E+02	1.799E+05	6.746E+02	3.948E+04	1.481E+02	5.528E+04	2.073E+02
1.333E+03	4.127E+04	3.095E+01	6.752E+04	5.064E+01	1.093E+05	8.196E+01	3.118E+05	2.338E+02	4.157E+05	3.118E+02	1.074E+05	8.058E+01	1.364E+05	1.023E+02
6.667E+03	1.652E+05	2.478E+01	2.444E+05	3.666E+01	2.853E+05	3.979E+01	6.443E+05	9.665E+01	7.598E+05	1.139E-02	2.636E+05	3.955E+01	3.094E+05	4.641E+01
logSR	logSS		logSS		logSS		logSS		logSS		logSS		logSS	
1.301	2.849		3.117		3.812		4.422		4.681		3.727		3.975	
1.824	3.290		3.587		4.190		4.745		4.952		4.162		4.359	
2.426	3.902		4.173		4.603		5.100		5.255		4.596		4.743	
3.125	4.616		4.829		5.039		5.494		5.619		5.031		5.135	
3.824	5.218		5.388		5.424		5.808		5.881		5.421		5.491	
N	1.05		1.10		1.56		1.80		2.04		1.49		1.67	

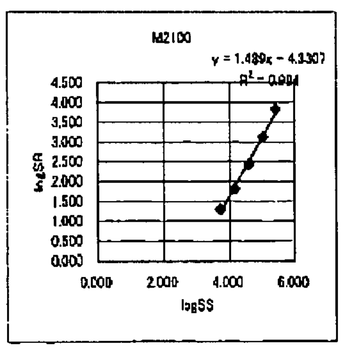


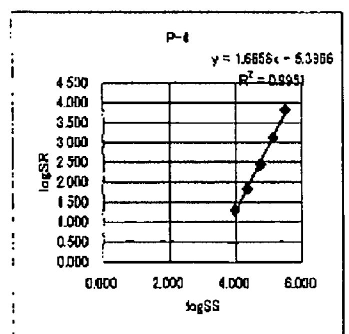












4. Results and Discussion

As is clear from Tables and Figures above, the non-Newtonian Coefficient (N) of all kinds of PPS polymers falls in a range of 1.05 to 2.04.

With respect to "P-4," its measured melting point of 276.5°C corresponds to a melting point of 277°C of "RYTON" in Example 4 of the cited reference, and the measured melt viscosity of "P-4" is 2310 poise at 300°C as shown at the column "Phillips" P-4 in the Tables and Figures above, whereas a melt viscosity of "RYTON" in Example 4 of the cited reference is 2200 poise, thereby resulting in viscosity difference of 110 poise between "P-4" and "RYTON" of the cited reference.

However, as is clear from Table 1 above, the non-Newtonian Coefficient (N) of 1.67 for "P-4," which is a highly cured product, is equivalent to the N value of 1.56 for "K-4G (highly cured product: DIC)," 1.80 for "LD-10G" (mildly cured product: DIC)," 2.04 for "LT-30G" (TCB branched product: DIC)," and 1.49 for "M2100 (cured product: Toray)," and significantly different from the non-Newtonian Coefficient (N) of 1.05 for "T-1G (non-cured product: DIC)" and 1.10 for "ML305 (linear product: DIC)."

These differences are clearly shown in Figs. 1 and 2 above. That is, Fig. 1 shows the relation between the non-Newtonian Coefficient (N) and Viscosity V6 (Pa, s), and Fig. 2 shows also the relation between the non-Newtonian Coefficient (N) and Viscosity V6 (poise).

As seen in both Figs. 1 and 2, the N value of "P-4" is on the line with a gently declining slope corresponding to the N values of high melt viscosities including the N values of 1.80 for "LD-10G" (mildly cured product: DIC)," and 2.04 for "LT-30G (TCB branched product: DIC)," which are different from the N values of 1.05 for "T-1G (non-cured product: DIC)," and 1.10 for "ML305 (linear product: DIC)," as well as the N values of 1.49 for "M2100 (cured product: Toray)," and 1.56 for "K-4G (highly cured product: DIC) on the line with a sharp declining slope.

The PPS polymer of the present invention has the non-Newtonian coefficient (N) of 1.06-1.19 and the melt viscosity (V_6) of 295-400 poise as shown in Table 1 (PAS-1, PAS-2, PAS-5 and PAS-6) in the specification as

shown below, the melt viscosity is far lower than that of "M2100," "RYTON" of the cited reference, "K-4," "P-4" supplied from Phillips, "LD-10G" and "LT-30G" in a range of 1630-31200 poise.

Table 1.

No.	Resin	Melt Viscosity V_6 (poise)	Non-Newtonian Coefficient N	Average Fiber Diameter (μm)	Melt-Blowing Stability
Example 1	PAS-1	300	1.13	7.5	Good
Example 2	PAS-2	295	1.09	8.1	Good
Example 3	PAS-5	400	1.19	9.5	Good
Example 4	PAS-6	320	1.06	5.7	Good
Comp. Ex. 1	PAS-3	310	1.02	15.0	Poor
Comp. Ex. 2	PAS-4	80	1.00	13.1	Poor
Comp. Ex. 3	PAS-7	450	1.22	17.3	Poor

Accordingly, major distinguished features of the present invention are found in making it possible to stably produce non-woven fabrics from the PPS polymer having extremely low melt viscosities by melt-blowing under a high-velocity air stream (see page 19, lines 2-5, Example 1 of the specification).

In contrast to the present invention, it should be emphasized that the Fukata's "RYTON" polymer has a melt viscosity of 2000 poise and is extruded through a spinneret having small holes, the extrudates being introduced into an aspirator, followed by discharging the extrudates from the aspirator at a rate of 1700 m/min to obtain the PPS filaments (see column 6, lines 44-59, Example 4 of Fukata), of which procedures are completely different from the present invention in not using a melt-blowing method.

Therefore, the non-Newtonian coefficient (N) of 1.06-1.19 is an essential factor required for the PPS polymer in the present invention, so that it can be said that the polyarylene sulfide having a branched structure as claimed in the non-Newtonian coefficient (N) of the polyarylene sulfide having

a branched structure as claimed in the present application is in the range of $1.05 \leq n \leq 1.20$

Accordingly, the non-Newtonian Coefficient of 1.67 for "RYTON" P-4 falls outside the range of $1.05 \leq n \leq 1.20$ of polyarylene sulfide having a branched structure or a cross-linked structure as claimed in the present application.

5. Conclusion

"RYTON" P-4 supplied from Phillips Petroleum Co. is a highly cured product and has a non-Newtonian Coefficient (N) of 1.67 and a melt viscosity of 2310 poise, of which value is far higher than that of the PPS polymer of the present application.

Thus, "RYTON" P-4 does not inherently have a non-Newtonian coefficient (N) of 1.05-1.20, but have a non-Newtonian coefficient (N) of more than 1.20.

The polyarylene sulfide having a branched structure as claimed in the non-Newtonian coefficient (N) of the polyarylene sulfide having a branched structure as claimed in the present application is in the range of $1.05 \leq n \leq 1.20$

9) I declare further that all statements made herein on personal knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Dated: Novembr 18, 2005 Satoshi Inoue

Name